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THE ROLE OF THREE-DIMENSIONAL ELECTROCARDIOGRAPHY IN IDENTIFYING LEFT VENTRICULAR HYPERTROPHY

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Background: The standard 12-lead ECG is insensitive for diagnosis of left ventricular hypertrophy(LVH) compared to transthoracic echocardiography(TTE). The objective of this study was to determine if 3-D ECG can identify LVH in patients with normal 12-lead ECG.

Methods: We studied 20 subjects with LVH by TTE(abnormal LV mass and LV mass index per ASE criteria) and normal ECG and 20 control subjects with no LVH. Patients with LVH by ECG, a conduction disturbance or prior myocardial infarction were excluded. All patients underwent recording of a 12-lead ECG with a PC-based high-fidelity system(Cardiosoft ©) and 3-D ECG was obtained by reconstruction of orthogonal leads using Kors regression method. 3-D ECG loops were rotated into the right sagittal plane and oriented to produce the largest loop. The area of the loop was measured by planimetry and divided into a posterior and anterior portion. The ratio of the posterior area to anterior area was calculated.

Results: Baseline characteristics of LVH and controls were similar in age(55.0 vs. 55.1, p NS), but the LVH group had a larger BMI(37.4 vs. 30.9, p .02) and more females(70% vs. 40%). The ratio of posterior to anterior loop area was significantly higher in the LVH group compared to controls(See Table 1).Posterior: anterior loop of > 1.7 had an 85% sensitivity for LVH diagnosis with a 75% specificity .

Conclusions: 3D ECG is significantly more sensitive than the standard ECG for the diagnosis of LVH and may allow for earlier detection of LVH.

Table 1

	Control (n=20)	LVH (n=20)	p-value
LV Mass (g)	132.7	244.6	<0.001
LV Mass Index (g/m2.7)	33.7	67.5	<0.001
Posterior area	32.8	46.6	< 0.001
Anterior area	22.4	21.5	0.7319
Posterior:anterior ratio	1.6	2.3	0.0013